



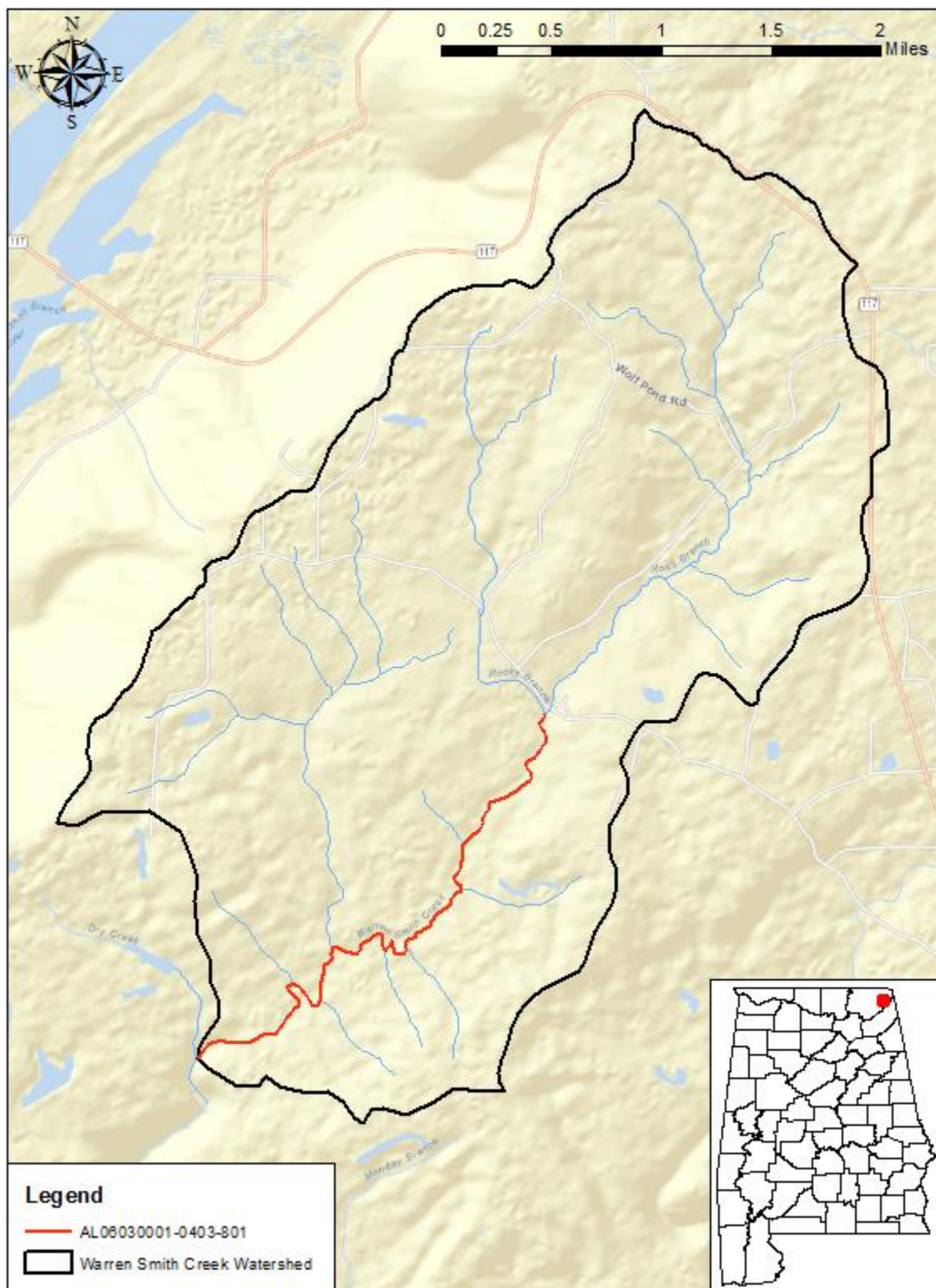
Draft
Delisting Decision
For
Warren Smith Creek

Assessment Unit ID # AL06030001-0403-801

Siltation

Alabama Department of Environmental Management
Water Quality Branch
Water Division
January 2018

Figure 1-1 Warren Smith Creek Watershed



<i>Table of Contents</i>	<i>Page</i>
1.0 Executive Summary	1
2.0 Basis for §303(d) Listing	1
3.0 Technical Basis for Delisting Decision.....	2
3.1 Water Quality Target Identification	2
3.2 Source Assessment	3
3.2.1 Point Sources in the Warren Smith Creek Watershed	3
3.2.2 Nonpoint Sources in the Warren Smith Creek Watershed.....	3
3.3 Land Use Assessment.....	5
4.0 Data Availability and Analysis	7
4.1 Methodology for Evaluating Siltation Impacts	7
4.2 Assessment of Ecoregion Reference Data	7
4.3 Data Analysis	9
5.0 Conclusions.....	10
6.0 Public Participation.....	10
7.0 Appendices.....	11
7.1 References	12
7.2 ADEM Water Quality Data and Reference Documents.....	13
7.3 Warren Smith Creek Watershed Photos.....	15

List of Figures

Page

Figure 1-1 Warren Smith Creek Watershed.....	i
Figure 3-1. NPDES Permits Within the Warren Smith Creek Watershed.....	4
Figure 3-2. Land Use Map for the Warren Smith Creek Watershed	5
Figure 3-3. Graph of the Primary Land Uses in the Warren Smith Creek Watershed	6
Figure 4-1. Level IV Ecoregions within the Warren Smith Creek Watershed	8

List of Tables

Table 3-1. Land Use Areas for the Warren Smith Creek Watershed.....	6
Table 4-1. Location Description of ADEM Sampling Stations.....	9
Table 4-2. Warren Smith Siltation Data Summary	10
Table 7-1. ADEM Siltation Data at Station WSCJ-1	13
Table 7-2. Alabama's 2010 Ecoregional Reference Guidelines	14

List of Photos

Photo 1 – WSCJ-1 Looking Upstream (Photo Taken 4/30/2013)	15
Photo 2 – WSCJ-1 Looking Downstream (Photo Taken 4/30/2013)	15

1.0 Executive Summary

Warren Smith Creek is located in Jackson County approximately seven miles southeast of the City of Stevenson in the Tennessee River Basin. Warren Smith Creek is a tributary to Dry Creek, which is a tributary to Coon Creek. Warren Smith Creek has a use classification of Fish and Wildlife (F&W). The impaired portion of Warren Smith Creek is 3.44 miles long and has a drainage area of 8.9 square miles. The Warren Smith Creek watershed is located almost entirely within the Level IV Eco-region 68d.

Warren Smith Creek was added to the State of Alabama's 1998 §303(d) list of impaired streams for pH and siltation by the United States Environmental Protection Agency (USEPA). The listing was based on data collected by ADEM in 1986 and 1987. The impaired segment extends from Dry Creek to Ross Branch. In 2002, Warren Smith Creek was delisted for pH. Warren Smith Creek was listed on Alabama's §303(d) list of impaired streams for siltation from 2000-2016. The source of the impairment is currently listed as abandoned surface mining.

In an effort to more fully evaluate existing conditions as related to the previous listing, ADEM collected water quality data on Warren Smith Creek at station WSCJ-160 in 2002 and at station WSCJ-1 in 2013. The 2002 data collected at WSCJ-160 was used to delist Warren Smith Creek for pH in 2002. The 2013 data collected at WSCJ-1 will be used to evaluate the siltation impairment. Total suspended solids (TSS) and turbidity data were both collected at WSCJ-1 in 2013. All of the TSS and turbidity samples were very low and were well below the eco-reference levels.

From examination of all available data, ADEM has determined that a siltation water quality impairment does not currently exist within Warren Smith Creek. Therefore, ADEM will not develop a TMDL for this parameter due to "more recent data," which is just cause for delisting waterbodies according to Title 40 of the Code of Federal Regulations (CFR), Part 130.7(b)(6)(iv).

2.0 Basis for §303(d) Listing

Section 303(d) of the Clean Water Act (CWA), as amended by the Water Quality Act of 1987 and EPA's Water Quality Planning and Management Regulations (Title 40 of the Code of Federal Regulations (CFR), Part 130), requires states to identify waterbodies which are not meeting water quality criteria applicable to their designated use classifications. The identified waters are prioritized based on severity of pollution with respect to designated use classifications. Total maximum daily loads (TMDLs) for all pollutants causing violation of applicable water quality criteria are established for each identified water. Such loads are established at levels necessary to implement the applicable water quality criteria with seasonal variations and margins of safety. The TMDL process establishes the allowable loading of pollutants, or other quantifiable parameters for a waterbody, based on the relationship between pollution sources and in-stream water quality conditions, so that states can establish water-quality based controls to reduce pollution from both point and non-point sources and restore and maintain the quality of their water resources (USEPA, 1991).

As mentioned in the Executive Summary, Warren Smith Creek was listed on the 1998 §303(d) list by the USEPA based on data collected in 1986 and 1987 by ADEM. After a thorough records search, no chemical, physical, or biological data was found to substantiate the §303(d) listing.

3.0 Technical Basis for Delisting Decision

3.1 Water Quality Target Identification

The State of Alabama currently has no numeric criteria for siltation; therefore, narrative criteria must be used to assess the siltation impairment. While numeric criteria normally have a quantifiable endpoint for a given parameter, narrative criteria are qualitative statements that establish a set of desired conditions for all State waters. These narrative criteria are commonly referred to as “free from” criteria that enable states a regulatory avenue to address pollutants or problems that may be causing or contributing to a use impairment that otherwise cannot be evaluated against any numeric criteria. Typical pollutants that fall under this category are nutrients and siltation. Historically, in the absence of established numeric criteria, ADEM and/or EPA would use available data and information coupled with best professional judgement to determine overall use support for a given waterbody. Narrative criteria continue to serve as a regulatory basis for determining use support and making listing/delisting decisions of waters in regards to Alabama’s §303(d) list. ADEM’s Narrative Criteria, as shown in ADEM Admin. Code r. 335-6-10-.06, are as follows:

335-6-10-.06 Minimum Conditions Applicable to All State Waters. *The following minimum conditions are applicable to all State waters, at all places and at all times, regardless of their uses:*

(a) State waters shall be free from substances attributable to sewage, industrial wastes or other wastes that settle to form bottom deposits which are unsightly, putrescent or interfere directly or indirectly with any classified water use.

(b) State waters shall be free from floating debris, oil, scum, and other floating materials attributable to sewage, industrial wastes or other wastes in amounts sufficient to be unsightly or which interfere directly or indirectly with any classified water use.

(c) State waters shall be free from substances attributable to sewage, industrial wastes or other wastes in concentrations or combinations, which are toxic or harmful to human, animal or aquatic life to the extent commensurate with the designated usage of such waters.

ADEM is continuing its efforts to develop a quantitative measure for siltation for specific surface waters throughout Alabama. However, until a numeric siltation criteria or some form of quantitative interpretation of ADEM’s narrative criteria is developed, the Department will continue to use all available data and information coupled with best professional judgment to make informed decisions regarding overall use support and when establishing numeric targets for TMDLs. For this delisting decision, physical water quality data was used in order to analyze the siltation impairment on Warren Smith Creek.

3.2 Source Assessment

3.2.1 Point Sources in the Warren Smith Creek Watershed

Continuous Point Sources

Currently there are no active NPDES Permits for continuous point sources within the Warren Smith Creek watershed.

Non-Continuous Point Sources

Warren Smith Creek currently has one permitted non-continuous point source within the watershed. Justice Coal of Alabama, Mine #3 (AL0078026) discharges to the most upstream portion of Warren Smith Creek, but it is believed that this operation is not causing or contributing to any siltation impairment in the waterbody. There are no CAFOs located in the Warren Smith watershed and currently none of the watershed qualifies as a Municipal Separate Storm Sewer System (MS4) area.

3.2.2 Nonpoint Sources in the Warren Smith Creek Watershed

From review of the data collected and land source assessment, it is believed that nonpoint sources are not causing or contributing to any siltation impairment in Warren Smith Creek. It should be noted that there is a history of coal mining in the Warren Smith Creek watershed.

Figure 3-1. NPDES Permits Within the Warren Smith Creek Watershed



3.3 Land Use Assessment

Land use for the Warren Smith Creek watershed was determined using ArcMap with land use datasets derived from the 2011 National Land Cover Dataset (NLCD). Figure 3-2 and Table 3-1 display the land use areas for the Warren Smith Creek watershed. Figure 3-3 is a graph depicting the primary land uses in the Warren Smith Creek watershed.

The majority of the Warren Smith Creek watershed is forested/natural (82.55%). Other major land uses within the watershed account for agricultural lands (11.93%), developed land (4.84%), and open water (0.68%). Developed land includes both commercial and residential land uses.

Figure 3-2. Land Use Map for the Warren Smith Creek Watershed

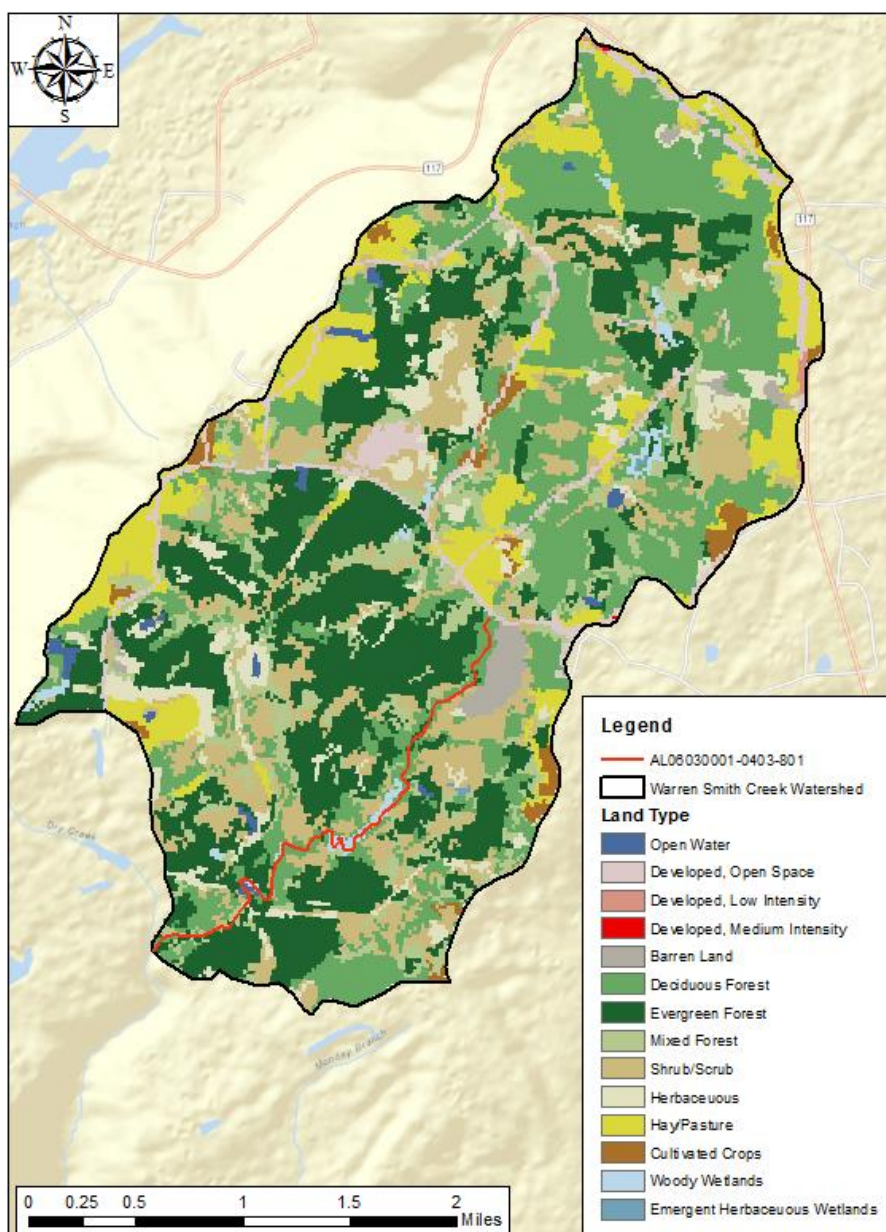
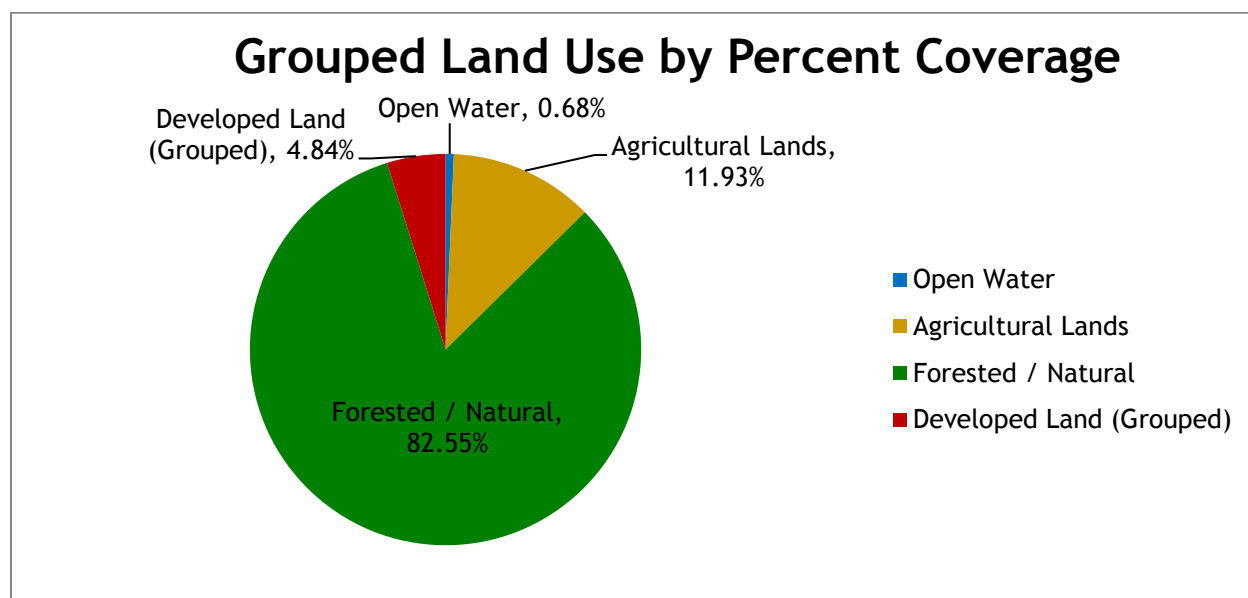


Table 3-1. Land Use Areas for the Warren Smith Creek Watershed

Class Description	Mi²	Acres	Percent
Open Water	0.06	38.92	0.68%
Developed, Open Space	0.31	201.49	3.53%
Developed, Low Intensity	0.01	8.67	0.15%
Developed, Medium Intensity	0.00	0.89	0.02%
Developed, High Intensity	0.00	0.00	0.00%
Barren Land	0.10	64.72	1.13%
Deciduous Forest	2.36	1513.17	26.54%
Evergreen Forest	2.28	1460.69	25.62%
Mixed Forest	0.78	502.39	8.81%
Shrub/Scrub	1.33	848.88	14.89%
Herbaceous	0.52	330.92	5.80%
Hay/Pasture	0.93	594.02	10.42%
Cultivated Crops	0.13	86.29	1.51%
Woody Wetlands	0.08	48.04	0.84%
Emergent Herbaceous Wetlands	0.01	3.34	0.06%
TOTALS →	8.91	5702.43	100.00%
Class Description	Mi²	Acres	Percent
Open Water	0.06	38.92	0.68%
Agricultural Lands	1.06	680.31	11.93%
Forested / Natural	7.36	4707.43	82.55%
Developed Land (Grouped)	0.43	275.77	4.84%
TOTALS →	8.91	5702.43	100.00%

Figure 3-3. Graph of the Primary Land Uses in the Warren Smith Creek Watershed



4.0 Data Availability and Analysis

4.1 Methodology for Evaluating Siltation Impacts

In determining appropriate or acceptable levels of siltation necessary to support Warren Smith Creek's designated use, ADEM elected to use a "reference condition" approach. This approach is based on the use of ambient water quality data from candidate reference streams located in characteristically similar types of watersheds known as ecoregions. ADEM considers the "reference condition" approach for determining appropriate siltation levels to be reasonable, protective of designated uses, and scientifically defensible in assessing and evaluating siltation influences or impacts.

Reference streams, also referred to as "reference reaches" or "ecoregional reference sites," are defined as relatively homogeneous areas of similar climate, land form, soil, natural vegetation, hydrology, and other ecologically relevant variables (USEPA, 2000b) which have remained comparatively undisturbed or minimally impacted by human activity over an extended period of time in relation to other waters of the State. While not necessarily pristine or completely undisturbed by humans, reference streams do represent desirable chemical, physical and biological conditions for a given ecoregion that can be used for evaluation purposes. The reference streams selected for a particular analysis depends primarily on the available number of reference streams and associated data within a particular ecoregion. Therefore, the total number of reference sites selected and the aerial scale (i.e. Ecoregion Level III, Level IV) used to represent a reference condition will often vary on a case-by-case basis.

ADEM selected to use the 90th percentile of the data distributions from the selected reference sites to establish goals for siltation, specifically TSS and turbidity, on an ecoregional basis. The 90th percentile of the data distribution is considered an appropriate target since it falls within an acceptable range of "least-impacted" conditions (i.e. upper quartile). Median values are used to represent existing TSS conditions within the impaired waterbody, and turbidity values are assessed on an individual sample basis. If the TSS concentrations and turbidity values of the subject impaired stream are relatively the same or below reference condition levels, then the stream is considered not to be impaired for siltation. If TSS concentrations and turbidity values within the impaired stream are shown to be above reference conditions, then other water quality data and information are used in the evaluation.

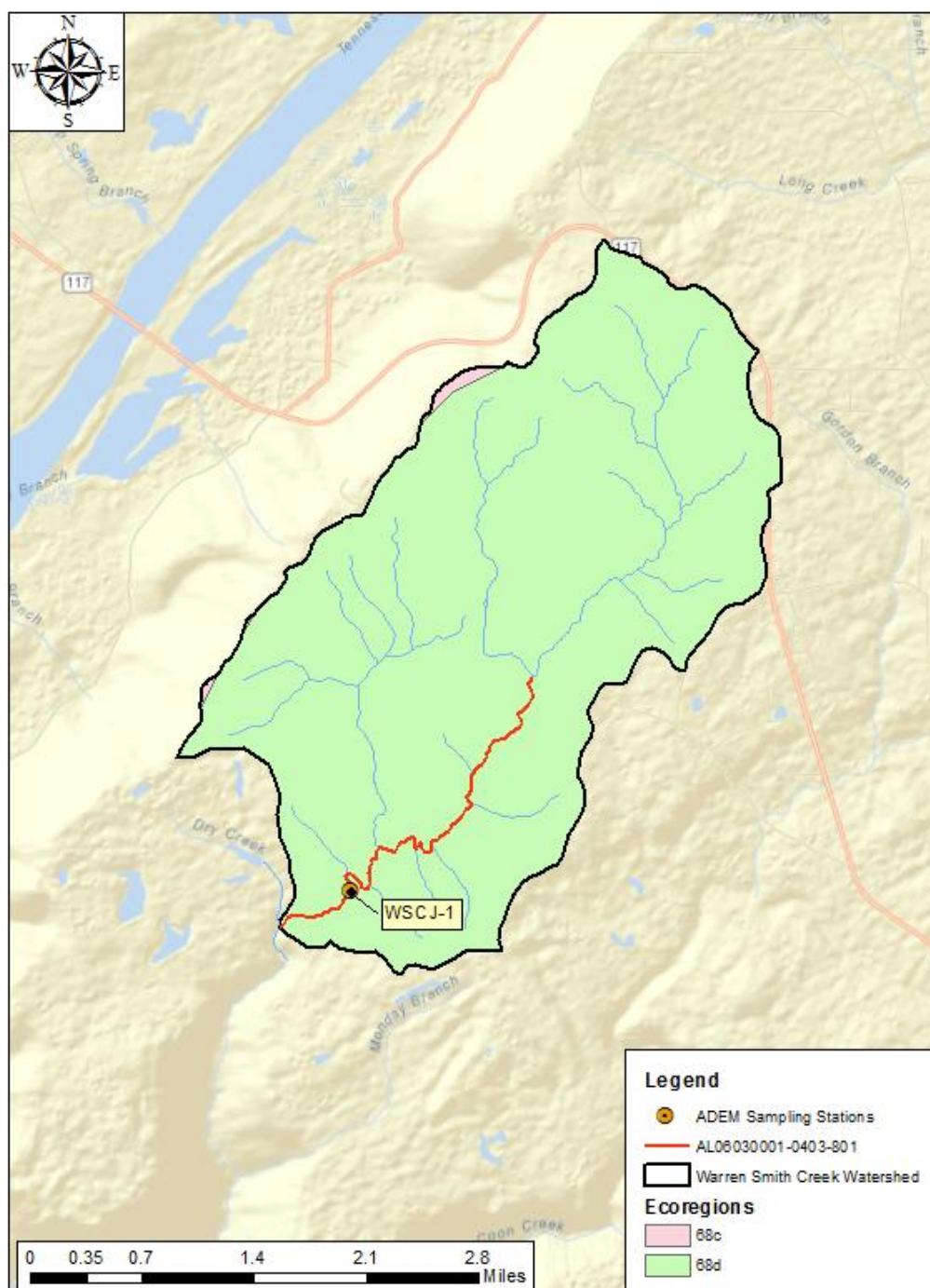
4.2 Assessment of Ecoregion Reference Data

Data from selected reference sites have been compiled and analyzed for the entire State of Alabama. Through much peer review, every effort was made to use the highest quality least-impacted reference reach data to accurately define background conditions. The reference reaches and their associated watersheds were established by ADEM using various methods to characterize their condition and determine if they were good candidates. Such methods include, but are not limited to, watershed surveys, landuse coverage, inventorying point and nonpoint sources, conducting field reconnaissance, and ultimately collecting chemical, physical and biological data to ensure their condition and verify the streams are of high quality and fully meet designated uses. The current list of reference values is included in a table referred to as "Alabama's 2010

Ecoregional Reference Guidelines.” This table of relevant ecoreference data can be found in Appendix 7.2, Table 7-2.

The Warren Smith Creek watershed lies within two Level IV ecoregions (68c and 68d), as depicted in Figure 4-1 below. Typically, when a watershed covers two Level IV ecoregions, a weighted average is calculated for each parameter (TSS and Turbidity); however, since only a minute amount of the watershed is in 68c, only ecoregion 68d values will be used for the analysis.

Figure 4-1. Level IV Ecoregions within the Warren Smith Creek Watershed



4.3 Data Analysis

The source of data that was utilized in this evaluation of the siltation impairment on Warren Smith creek is from the Department's 2013 §303(d) sampling program. During the sampling period both field parameters and conventional lab parameters were collected at station WSCJ-1. There were a total of 8 total suspended solids (TSS) samples collected during this time. All of the samples collected were below 10.0 mg/L and most were below the method detection limit (MDL) of 1.0 mg/L. Also, the median value of these samples was compared to the eco-reference value of 27 mg/L. The median value of the samples was well below the eco-reference TSS value.

Turbidity samples were also collected to help analyze the siltation impairment. There were a total of 8 turbidity samples collected at station WSCJ-1. All of these samples were below 10 Nephelometric Turbidity Units (NTUs), and all of the samples were well below the eco-reference turbidity value. Given that all of the samples were well below the eco-reference turbidity values, all of the samples were also well below ADEM's turbidity criterion, which is stated in ADEM Admin. Code r. 335-6-10-.09 (5) (e) 9 as follows:

9. *Turbidity: there shall be no turbidity of other than natural origin that will cause substantial visible contrast with the natural appearance of waters or interfere with any beneficial uses which they serve. Furthermore, in no case shall turbidity exceed 50 Nephelometric units above background. Background will be interpreted as the natural condition of the receiving waters without the influence of man-made or man-induced causes. Turbidity levels caused by natural runoff will be included in establishing background levels.*

A summary of the TSS and turbidity samples is shown below in Table 4-2.

Table 4-1. Location Description of ADEM Sampling Stations

Station ID	Stream	Station Description	Latitude	Longitude	County	Ecoregion/ Sub region
WSCJ-1	Warren Smith Creek	Turn left off CR 81 at 34.81031 / -85.76829. (at Fabius Volunteer Fire Station) at old surface mining road	34.78139°	-85.77758°	Jackson	68D

Table 4-2. Warren Smith Siltation Data Summary

Station ID	Visit Date	Measured Flow (cfs)	TSS (mg/L)	TSS Detect Conditions	Turbidity (NTU)	Turbidity Detect Conditions	Turbidity Ecoref 90th %tile
WSCJ-1	4/9/2013	17.7	6		2.91		9.667
WSCJ-1	4/30/2013	26.5	1	< MDL 1	7.74		9.667
WSCJ-1	6/4/2013	6	1	< MDL 1	3.05		9.667
WSCJ-1	7/16/2013	13.5	1	< MDL 1	3.53		9.667
WSCJ-1	8/13/2013	3.9	4	JQ6	2.54		9.667
WSCJ-1	9/3/2013	3.2	1	< MDL 1	1.86		9.667
WSCJ-1	10/1/2013	1.6	4		1.95		9.667
WSCJ-1	11/12/2013	1.4	1	< MDL 1	1.89		9.667
Median:			1				
Eco-Region Value:			27				

MDL: Method Detection Limit

JQ6: The identification of the analyte is acceptable; the reported value is an estimate. Spurious contamination or reagent contamination is evident at a level that affects accuracy.

As previously mentioned, the land use cover for the Warren Smith Creek watershed is predominately forested/herbaceous cover originating from historical surface mining reclamation activities in the watershed. Upstream of station WSCJ-1, Warren Smith Creek is characterized by a series of deep, wide pools likely resulting from the stream morphology being altered during surface mining reclamation activities many years ago. After visiting the stream prior to sampling, the Department determined that station WSCJ-1 was not a suitable location to conduct a macro-invertebrate community assessment based upon stream conditions that are not conducive to the Department's biological community assessment protocol.

5.0 Conclusions

From examination of all available water quality data, ADEM has determined that a siltation water quality impairment does not currently exist within Warren Smith Creek. Therefore, ADEM will not develop a TMDL for this parameter due to "more recent data," which is just cause for delisting waterbodies according to Title 40 of the Code of Federal Regulations (CFR), Part 130.7(b)(6)(iv).

6.0 Public Participation

As part of the public participation process, this Delisting Decision (DD) will be placed on public notice and made available for review and comment. The public notice will be prepared and published in the major daily newspapers in Montgomery, Huntsville, Birmingham, and Mobile, as well as submitted to persons who have requested to be on ADEM's postal and electronic mailing distributions. In addition, the public notice and subject DD will be made available on ADEM's

Website: www.adem.state.al.us. The public can also request paper or electronic copies of the DD by contacting Ms. Kimberly Minton at 334-271-7826 or kminton@adem.alabama.gov. The public will be given an opportunity to review the DD and submit comments to the Department in writing. At the end of the public review period, all written comments received during the public notice period will become part of the administrative record. ADEM will consider all comments received by the public prior to finalization of this DD and subsequent submission to EPA Region 4 for final review and approval.

7.0 Appendices

7.1 References

ADEM Administrative Code, 2017. Water Quality Program, Chapter 335-6-10, Water Quality Criteria, and Chapter 335-6-11 Use Classifications for Interstate and Intrastate Waters.

Alabama's §303(d) Monitoring Program. 2001, 2002 & 2013. ADEM.

Alabama Department of Environmental Management. *Alabama's 2010 Ecoregional Reference Guidelines*. 2010. ADEM

Alabama Department of Environmental Management, 1998, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014 & 2016 §303(d) Lists. ADEM.

ALAWADR Database (Water Quality Data). ADEM.

United States Environmental Protection Agency. 1991. *Guidance for Water Quality-Based Decisions: The TMDL Process*, Office of Water, EPA 440/4-91-001.

United States Environmental Protection Agency. 1986. *Quality Criteria for Water 1986*, Office of Water Regulations and Standards, EPA 440/5-86-001.

United States Environmental Protection Agency. 1999. *Decision Document Concerning EPA's Addition of Waters and Pollutants to Alabama's §303(d) List*.

United States Environmental Protection Agency. 2000b. Nutrient Criteria Technical Guidance Manual: River and Streams. Office of Water. EPA 822-B-00-002.

7.2 ADEM Water Quality Data and Reference Documents

Table 7-1. ADEM Siltation Data at Station WSCJ-1

Station ID	Visit Date	Measured Flow (cfs)	TSS (mg/L)	TSS Detect Conditions	Turbidity (NTU)	Turbidity Detect Conditions	Turbidity Ecoref 90th %tile
WSCJ-1	4/9/2013	17.7	6		2.91		9.667
WSCJ-1	4/30/2013	26.5	1	< MDL 1	7.74		9.667
WSCJ-1	6/4/2013	6	1	< MDL 1	3.05		9.667
WSCJ-1	7/16/2013	13.5	1	< MDL 1	3.53		9.667
WSCJ-1	8/13/2013	3.9	4	JQ6	2.54		9.667
WSCJ-1	9/3/2013	3.2	1	< MDL 1	1.86		9.667
WSCJ-1	10/1/2013	1.6	4		1.95		9.667
WSCJ-1	11/12/2013	1.4	1	< MDL 1	1.89		9.667

MDL: Method Detection Limit

JQ6: The identification of the analyte is acceptable; the reported value is an estimate. Spurious contamination or reagent contamination is evident at a level that affects accuracy.

Table 7-2. Alabama's 2010 Ecoregional Reference Guidelines

Alabama's 2010 Ecoregional Reference Guidelines																			
Parameters	Basis of comparison	Result to compare	Level 4 45a	Level 4 45d	Level 3 45	Level 4 65a/b	Level 4 65f	Level 4 65g	Level 4 65i	Level 4 65j	Level 4 65q	Level 4 67f	Level 4 67h	Level 3 67	Level 4 68d	Level 4 68e	Level 3 68	Level 4 71f	Level 3 71
Physical																			
Temperature (°C)	90th %ile	Median	24.656	25	25	27	24.6	27	25	24	27	24	26	25.7	25	23.48	24	22.12	22.586
Turbidity (NTU)	90th %ile	INDIVIDUAL	21.7	6.823	15	49.56	3.7	13.05	26.21	10.73	42.3	6.622	10.787	8.824	9.667	9.025	10.1	3.693	11.1
Total Dissolved Solids (mg/L)	90th %ile	Median	67.9	85.4	80	162.8	53.4	97.4	63.3	167.6	103.4	165	79.4	151.2	118	84.8	97.2	79.6	150.5
Total Suspended Solids (mg/L)	90th %ile	Median	16	12	15	45	13.2	16.3	27.5	26.9	104.6	11.3	12.7	12.4	27	10	14	9.6	8.9
Specific Conductance (µmhos)	Median	Median	40.1	37	39.05	129.7	20.4	53.4	25.8	70	72.5	207	34.35	86	49.5	37	39.15	96	109
Hardness (mg/L)	Median	Median	10.65	11.1	11	56	14	14.2	6.52	82.1	34.6	94.05	8.56	42.3	16.2	10	12.15	47.2	56
Alkalinity (mg/L)	90th %ile	Median	21.8	23.5	23.01	84.41	11.8	21.85	21.05	130.64	36.36	121.73	16.54	117.716	21	44.2	42.2	57.432	109.4
Stream Flow (cfs)																			
Chemical																			
Dissolved Oxygen (mg/L)	10th %ile	Median	7.665	7.6	7.6	5.1	6.94	4.484	6.692	7.64	6.8	7.44	7	7	5.609	7.51	6.79	8.113	7.61
pH (su)	10th %ile	Median	6.5	6.787	6.64	6.758	4.436	5.69	5.82	6.31	6.6	6.338	6.69	6.768	6.482	6.522	6.5	7.162	7.345
pH (su)	90th %ile	Median	7.68	7.679	7.7	8.052	6.55	6.815	7.18	8.1	7.74	8.294	8	8.278	7.352	7.852	7.84	8.35	8.34
Ammonia Nitrogen (mg/L)	90th %ile	Median	0.0078	0.0105	0.0105	0.04802	0.046	0.0203	0.0905	0.0932	0.074	0.0228	0.031	0.0346	0.119	0.0945	0.1007	0.023	0.023
Nitrate+Nitrite Nitrogen (mg/L)	90th %ile	Median	0.1241	0.0718	0.0974	0.286	0.3258	0.2432	0.2764	0.3436	0.0634	0.261	0.0888	0.2403	1.202	0.456	0.6191	0.6895	1.42
Total Kjeldahl Nitrogen (mg/L)	90th %ile	Median	0.40482	0.2598	0.28448	0.887	0.4176	0.583	0.6782	0.4858	0.6346	0.431	0.5107	0.5826	1.46	0.6595	0.733	0.624	0.466
Total Nitrogen (mg/L)	90th %ile	Median	0.53114	0.3224	0.40016	1.1634	0.6396	0.773	0.8512	0.8064	0.69205	0.6836	0.69365	0.7109	2.269	0.9185	1.41685	1.295	1.57
Dissolved Reactive Phosphorus (mg/L)	90th %ile	Median	0.0214	0.027	0.0243	0.0618	0.0264	0.0236	0.023	0.0167	0.0193	0.0174	0.0162	0.017	0.0109	0.019	0.0182	0.017	0.0155
Total Phosphorus (mg/L)	90th %ile	Median	0.0663	0.0537	0.0599	0.201	0.04	0.0698	0.0682	0.0577	0.064	0.0514	0.0429	0.0566	0.0491	0.0501	0.05	0.1053	0.0497
CBOD-5 (mg/L)	90th %ile	Median	2.57	2.37	2.4	3.2	1.96	2.65	2	2.53	2.3	1.78	2.58	2.3	1.86	1.9	1.9	1.1	1.1
Chlorides (mg/L)	90th %ile	Median	4.778	4.029	4.495	12.032	6.692	6.066	4.2852	5.247	5.95	4.266	3.61	3.89	9.118	1.051	6.37	2.4112	2.622
Total Metals																			
Aluminum (mg/L)	90th %ile	Median	0.2437	0.1558	0.1954	1.181	0.4886	0.2732	0.801	0.4045	1.561	0.2104	0.356	0.4114	0.155	0.265	0.3055	0.1954	0.127
Iron (mg/L)	90th %ile	Median	1.094	0.5648	0.8722	2.362	1.352	3.976	3.548	0.839	2.13	0.893	0.733	0.9803	0.6855	1.047	1.046	0.4085	0.4294
Manganese (mg/L)	90th %ile	Median	0.0554	0.0647	0.057	0.215	0.0436	0.7372	0.8094	0.081	0.113	0.067	0.052	0.0628	0.184	0.0563	0.1553	0.025	0.025
Dissolved Metals																			
Aluminum (mg/L)	90th %ile	Median	0.05485	0.0545	0.0545	0.1365	0.2242	0.0545	0.1	0.11	0.193	0.1	0.1	0.1	0.1	0.1	0.1	0.03	0.03
Antimony (µg/L)	90th %ile	Median	1	1	1	1	3.75	1	5	5	3.75	5	1	5		14	14	5	5
Arsenic (µg/L)	90th %ile	Median	5	5	5	5	5	5	5	5	5	9.2	5	5		5	5	12.1	12
Cadmium (mg/L)	90th %ile	Median	0.0435	0.0435	0.0435	0.0435	0.0394	0.0435	0.0435	0.0435	0.0435	0.0435	0.0435	0.0435		0.0448	0.04415	0.0075	0.0075
Chromium (mg/L)	90th %ile	Median	0.0395	0.0395	0.0395	0.0395	0.0321	0.0395	0.0395	0.0395	0.0395	0.0395	0.0395	0.0395		0.0416	0.04055	0.025	0.025
Copper (mg/L)	90th %ile	Median	0.043	0.043	0.043	0.043	0.0349	0.043	0.043	0.075	0.043	0.043	0.043	0.043	0.0298	0.043	0.043	0.1	0.1
Iron (mg/L)	90th %ile	Median	0.292	0.2248	0.256	0.503	0.6132	0.8042	0.5392	0.2445	1.255	0.1218	0.1885	0.2428	0.1552	0.588	0.588	0.025	0.0579
Lead (µg/L)	90th %ile	Median	1	1	1	1	2.5	1	5	5	2.5	5	1	5	1	5	5	5	5
Manganese (mg/L)	90th %ile	Median	0.02665	0.0235	0.0253	0.1224	0.0328	0.7886	0.8218	0.025	0.1084	0.025	0.0235	0.025		0.05	0.05	0.025	0.025
Mercury (µg/L)	90th %ile	Median	0.15	0.15	0.15	0.15	0.25	0.15	0.25	0.2	0.25	0.2	0.2	0.2	0.18	0.2	0.2	0.15	0.15
Nickel (mg/L)	90th %ile	Median	0.114	0.114	0.114	0.114	0.0936	0.114	0.05	0.114	0.114	0.0884	0.114	0.114		0.114	0.114	0.025	0.025
Selenium (µg/L)	90th %ile	Median	5	5	5	5	5	5	25	23	5	23	5	5		50	50	15	25
Silver (mg/L)	90th %ile	Median	0.058	0.058	0.058	0.058	0.0467	0.058	0.05	0.058	0.058	0.0548	0.058	0.058		0.058	0.058	0.025	0.025
Thallium (µg/L)	90th %ile	Median	0.5	0.5	0.5	0.5	4.5	0.5	5	5	4.5	5	0.5	5		18.5	18.5	5	5
Zinc (mg/L)	90th %ile	Median	0.0345	0.0345	0.0345	0.0345	0.0294	0.0345	0.0345	0.0345	0.0345	0.0345	0.0345	0.0345	0.0267	0.0438	0.0345	0.03	0.0285
Biological																			
Chlorophyll a (µg/L)	90th %ile	Median	5.019	2.14	2.67	5.181	1.755	1.282	4.732	3.31	3.949	2.562	2.086	2.322	1.392	2.458	2.67	3.044	4.255
Fecal Coliform (col/100 mL)	90th %ile	Median	332	116	201.2	1564	400	234	620	582	1025	1416	152.2	197	829	252	320	200	435

7.3 Warren Smith Creek Watershed Photos

Photo 1 – WSCJ-1 Looking Upstream (Photo Taken 4/30/2013)



Photo 2 – WSCJ-1 Looking Downstream (Photo Taken 4/30/2013)

